

Adaptive moving window technique for simulation of stationary shock waves

Murzov S A^{1,2,3,@}, Zhakhovsky V V^{1,2,3}, Parshikov A N^{1,2},
Dyachkov S A^{1,2} and Grigoryev S Yu^{1,2,3}

¹ Dukhov Research Institute of Automatics (VNIIA), Sushchevskaya 22,
Moscow 127055, Russia

² Joint Institute for High Temperatures of the Russian Academy of Sciences,
Izhorskaya 13 Bldg 2, Moscow 125412, Russia

³ Landau Institute for Theoretical Physics of the Russian Academy of Sciences,
Akademika Semenova 1a, Chernogolovka, Moscow Region 142432, Russia

@ murzovs@gmail.com

The shock Hugoniot parameters of heterogeneous Ni-Al laminate are obtained from the mesomechanical SPH simulation using the newly developed adaptive moving window (AMW) technique. In the known MW method [1, 2], the outflow velocity is varied so that the shock wave speed is adjusted in order to establish a steady position within the computational domain, while the inflow velocity is fixed. In contrast, the AMW maintains difference between the outflow and inflow velocities applying the Galileo transformations adaptively for MW coordinate system, which eliminates the undesired disturbances of shock speed. We demonstrate that all tested simulation technique converge to the same steady solution, but our new AMW technique converges much faster.

- [1] Zhakhovskii V V, Zybin S V, Nishihara K and Anisimov S I 1999 *Phys. Rev. Lett.* **83** 1175–1178
- [2] Murzov S A, Parshikov A N, Dyachkov S A, Egorova M S, Medin S A and Zhakhovsky V V 2021 *H. Temp.* **59** 195–204